

IN THE CLAIMS:

Claim 1 (Currently amended) Apparatus ~~in a combination~~ for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions, including

an electrode ~~constructed~~ adapted to be attached to the patient's skin at one of the selective positions to provide signals indicative of the parameters on the patient's body at the one of the selective positions,

an amplifier having an input terminal with an impedance approaching infinity and providing at an output terminal signals having characteristics corresponding to the characteristics of the signals from the electrode to eliminate ~~any~~ noise resulting from movements of the patient, and

an output stage connected to the amplifier and constructed to reject remaining noise in the signal from the amplifier, and constituting a first low pass filter to pass signals at frequencies below a particular value.

Claim 2 (currently amended) Apparatus ~~in a combination~~ as set forth in claim 1 wherein

a second electrode is adapted ~~constructed~~ to be attached to the patient's skin at a position displaced from the first electrode and wherein a second amplifier corresponding to the first amplifier is adapted to be connected to the second electrode and wherein a second low pass filter corresponding to the first low pass filter is connected to the second amplifier to reject remaining noise in the second amplifier and wherein

a common mode rejection is provided in the low pass filters to the signals from the electrodes to eliminate noise from the signals provided by the amplifiers.

Claim 3 (currently amended) Apparatus ~~in a combination~~ as set forth in claim 1

wherein

the input impedance of the amplifier is approximately  $10^{15}$  ohms.

Claim 4 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 1 wherein

~~the impedance of the patient's skin is adapted to provide impedance~~ in a range to approximately 200 kilohms and wherein the electrode is shaped to be attached to the patient's skin.

Claim 5 (currently amended) Apparatus ~~In a combination~~ as set forth in claim ~~1-2~~ wherein

the input impedance of the amplifier is approximately  $10^{15}$  ohms, and wherein

the impedance of the patient's skin is adapted to provide an impedance in a range to approximately 200 kilohms, and wherein

the electrode is adapted to be attached to the patient's skin.

Claim 6 (currently amended) Apparatus ~~In a combination~~ for providing a signal at one of the selective positions on a patient's skin of the patient's parameters at the one of the selective positions, including

an electrode adapted ~~constructed~~ to be applied to the one of the selective positions of the patient's skin to provide a signal representative of the patient's parameters at this selective position,

an amplifier adapted to be connected to the electrode to amplify the signal at the electrode without any loss in signal strength in the amplifier and without producing noise resulting from movements of the patient, and without changing the characteristics

of the signal at the electrode.

a low pass filter connected to the amplifier to provide an output in which remaining noise is eliminated and signals in a particular frequency range are passed by the low pass filter,

the amplifier having characteristics of providing a high input impedance and a low output impedance.

Claim 7 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 6 wherein

a second electrode adapted to be connected to the patient's skin provides a reference and wherein

the amplifier constitutes a differential amplifier for eliminating noise from the signals provided by the electrodes and for maintaining the strength of the signal at the electrodes and without changing the characteristics of the signal at the electrodes.

Claim 8 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 6 wherein

the amplifier includes a differential stage for eliminating noise from the signals provided by the electrode.

Claim 9 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 6 wherein

the amplifier provides an input impedance approaching infinity.

Claim 10 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 6 wherein

the output of the amplifier is introduced to the low pass filter.

Claim 11 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 9 wherein

the low pass filter limits the amplitude of the output from the low pass filter to facilitate the operation of the amplifier in processing the signal and wherein

the amplifier has a low output impedance.

Claim 12 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 6 wherein

the amplifier provides an input impedance approaching infinity, and wherein

the output from the amplifier is introduced to the low pass filter, and wherein

the low pass filter limits the amplitude of the output from the low pass filter to facilitate the operation of the amplifier in processing the signals and wherein

the amplifier has a low output impedance.

Claim 13 (currently amended) Apparatus In combination for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions, including

a first electrode adapted ~~constructed~~ to be attached to the patient's skin at a first one of the selective positions to provide signals representing the patient's parameters at this position,

a second electrode adapted ~~constructed~~ to be attached to the patient's skin at a second one of the selective positions different from the first position to provide reference signals,

a pair of amplifiers respectively ~~adapted to be~~ connected to the first and second electrodes ~~relating~~ and having properties of providing a high input impedance approaching infinity and having a low output impedance to eliminate noise resulting from movements of the patient, and providing characteristics corresponding to the characteristics of the signal at the electrodes, and

a pair of low pass ~~filter~~ filters differentially connected to the amplifiers for eliminating noise and for passing signals at relatively low frequencies with characteristics corresponding to the characteristics of the signals at the first electrode

Claim 14 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 13 wherein

the amplifiers are connected on a differential basis ~~constructed~~ to obtain the difference between the signals on the first and second electrodes and are provided ~~without~~ substantially identical constructions.

Claim 15 (currently amended) In a combination as set forth in claim 13 wherein

the amplifiers provide a differential relationship for eliminating noise resulting from movements of the patient without affecting the strength of the signals provided by the amplifiers and without affecting the characteristics of the signals from the electrodes.

Claim 16 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 15 wherein

the combination of the patient's skin and each individual one of the electrodes ~~has~~ provides an impedance to approximately 200 kilohms and each of the amplifiers has an input impedance of approximately  $10^{15}$  ohms and a substantially identical construction relative to the other amplifier to eliminate noise resulting from the patient's movements.

Claim 17 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 13 wherein

the combination of the patient's skin and each individual one of the electrodes is adjusted to provide ~~has~~ an impedance to approximately 200 kilohms and each of the amplifiers has an input impedance of approximately  $10^{15}$  ohms and wherein

the amplifiers have a substantially identical construction.

Claim 18 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 13 wherein

each of the amplifiers has an output impedance of approximately fifty (50) ohms to seventy-five (75) ohms.

Claim 19 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 13 wherein

the amplifiers are adapted ~~constructed~~ to obtain the difference between the signals on the first and second electrodes and wherein

the amplifiers provide a differential relationship for eliminating noise and for eliminating signals resulting from movements of the patient.

Claim 20 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 19 wherein

the combination of the patient's skin and each individual one of the electrodes is adapted to provide ~~has~~ an impedance to approximately 200 kilohms and each of the amplifiers has an input impedance of approximately  $10^{15}$  ohms and wherein

each of the amplifiers has an output impedance of approximately fifty (50) ohms to seventy five (75) ohms and wherein

the amplifiers have substantially identical constructions.

Claim 21 (currently amended) Apparatus ~~In a combination~~ for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions, including

a first electrode adapted to be coupled to the patient's skin at one of the selective positions for producing first signals representing the patient's parameters at this position,

a second electrode adapted to be coupled to the patient's skin at a position other than the one of the selective positions for producing reference signals,

a first amplifier adapted to be coupled to the first electrode for amplifying the first signals, the first amplifier having an input impedance approaching infinity, and

a second amplifier adapted to be coupled to the second electrode for amplifying the second signals, the second amplifier having an input impedance approaching infinity,

the first and second amplifiers being adapted to be connected in a differential relationship circuit to the first and second electrodes to eliminate noise even during movements of the patient and to produce an output signal representing the difference between the first and ~~reference-second~~ signals and identical to the difference between the signals at the first and second electrodes-

Claim 22 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 21 wherein

the first and second amplifiers have substantially identical characteristics and the first and second electrodes have substantially identical characteristics and the first and second amplifier in the differential relationship provide output signals having

characteristics corresponding to the differential in the characteristics of the signals on the first and second electrodes.

Claim 23 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 21 wherein

each of the amplifiers has an input impedance of approximately  $10^{15}$  ohms and has an output impedance of approximately 50 ohms to 75 ohms.

Claim 24 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 22 wherein

each of the first and second amplifiers has a low output impedance with substantially identical characteristics.

Claim 25 (currently amended) Apparatus ~~In combination~~ for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions, including

a first electrode adapted to be coupled to the patient's skin at one of the selective positions for producing signals representing the patient's parameters at this position,

a second electrode adapted to be connected to the patient's skin at a position displaced from the one of the selective positions for producing reference signals,

a pair of low pass filters differentially connected to the first and second electrodes for producing low frequency signals representing the difference between the signals on the electrodes, and

a pair of substantially identical amplifiers differentially connected to the pair of low pass filters for eliminating any noise provided in the electrodes ~~low pass filter~~ from movements of the patient, each of the amplifiers having an input impedance



approaching infinity and having a substantially identical construction to produce signals having characteristics identical to the characteristics of the difference of the signals on the electrodes.

Claim 26 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 25 wherein

each of the amplifiers has an input impedance of approximately  $10^{15}$  ohms.

Claim 27 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 25 wherein

each of the amplifiers has an output impedance having a low value considerably less than the input impedance of the amplifier.

Claim 28 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 26 wherein

each of the amplifiers has an output impedance of approximately 50 ohms to 75 ohms.

Claim 29 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 26 25, including

the low pass filters being connected to input the amplifiers on the differential basis,

the pair of amplifiers including a pair of output terminals providing the output from the amplifiers, and

a second pair of low pass filters differentially connected to the output terminals of the amplifiers for passing the low frequency signals representing the difference between the signals on the output terminals of the amplifiers.

Claim 30 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 25, including

the electrodes having identical characteristics, and

the amplifiers having identical characteristics and

the first pair of low pass filters having identical characteristics, and

the second pair of low pass filters having identical characteristics.

Claim 31 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 25 wherein

the low pass filters include ~~is formed from~~ a plurality of capacitors differentially connected to the pair of amplifiers.

Claim 32 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 25 wherein

the amplifiers include a pair of transistors having terminals respectively adapted to be connected to the first and second electrodes.

Claim 33 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 6 wherein

the amplifier has an input and an output and wherein

the low pass filter is a first low pass filter and is connected to the output of the amplifier and is provided with characteristics to provide an output in which noise is eliminated and signals in the particular frequency range are passed by the low pass filter and wherein

a second low pass filter is adapted to be connected between the electrode

and the input of the amplifier to eliminate noise and to pass signals in the particular frequency range.

Claim 34 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 33 wherein

the first low pass filter operates on a differential basis and wherein

the second low pass filter operates on ~~a~~ the differential basis in conjunction with the first low pass filter.

Claim 35 (currently amended) Apparatus ~~In a combination~~ for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions, including

an electrode ~~adapted~~ constructed to be attached to the patient's skin at an individual one of the selective positions to provide signals indicative of the parameters on the patient's body at the individual one of the selective positions; and

an amplifier ~~adapted to be constructed~~ connected to the electrode and having characteristics to pass the signals from the electrode through the amplifier without loss in signal strength of the signals from the electrode and without any change in the characteristics of the signals from the electrode ~~signal characteristics.~~

Claim 36 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 35, including

a circuit constituting a low pass filter and connected to the amplifier to eliminate noise in the signals from the amplifier.

Claim 37 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 36 wherein

the amplifier is constructed to eliminate noise on the electrodes and

the circuit is connected to the output of the amplifier to operate ~~operates~~ as a low pass filter to eliminate noise.

Claim 38 (currently amended) Apparatus ~~In a combination~~ for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions, including

a pair of electrodes adapted ~~constructed~~ to be attached respectively to the patient's skin at a spaced pair of selective positions to provide signals indicative of the parameters at the spaced pair of the selective positions, and

a pair of amplifiers each adapted ~~constructed~~ to be connected to an individual one of the electrodes to pass signals from the individual one of the electrodes and to provide output signals having characteristics corresponding to ~~representing~~ the difference between the characteristics of the signals on the electrodes without loss in the strength of the signals on the electrodes and without changes in the characteristics of the differences of the signals ~~between~~ at the electrodes, the amplifiers being provided with characteristics, and being differentially connected to each other, to eliminate noise resulting from movements of the patient during the production of the signals in the electrodes.

Claim 39 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 38, including

a differential ~~circuit~~ circuits connected to the amplifiers in a differential relationship to further eliminate noise in the signals representing the difference between the signals on the electrodes.

Claim 40 (currently amended) Apparatus ~~In a combination~~ as set forth in claim 39 wherein

the differential ~~circuit operates~~ circuits operate as ~~[[a]]~~ low pass filters to further eliminate noise and wherein the electrodes have identical characteristics and wherein the amplifiers have identical characteristics.

Claim 41 (withdrawn)

In combination for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions,

first and second electrodes constructed to be attached to the patient's skin respectively at first and second ones of the selective positions to provide first and second signals representing the patient's parameters at these positions,

first, second and third capacitors connected in a series relationship,

each of the first and third capacitors having a first terminal providing a reference potential and having a second terminal connected to an individual one of the terminals in the second capacitor,

the second terminals in the first and third capacitors being respectively connected to receive the first and second signals and to provide across the second capacitor a third signal constituting the difference between the first and second signals, and

a pair of amplifiers respectively connected to the terminals of the second capacitor and providing a high input impedance and a low output impedance to eliminate noise resulting in the second capacitor from movements of the patient and each of the amplifiers having a unity gain.

Claim 42 (withdrawn)

In a combination as set forth in claim 41 wherein

the first and second electrodes have substantially identical characteristics and the pair of amplifiers have substantially identical characteristics and the first and third

capacitors have substantially identical characteristics.

Claim 43 (withdrawn)

In a combination as set forth in claim 41 wherein

the amplifiers have input impedances approaching infinity and have low output impedances and have substantially identical characteristics and wherein

a first resistor is connected between the first electrode and the second terminal of the first capacitor to define a first low pass filter with the first capacitor and is connected to an input terminal of the first amplifier and wherein

a second resistor is connected between the second electrode and the second terminal of the third capacitor to define a second low pass filter with the third capacitor and is connected to an input terminal of the second amplifier and wherein

the first and second resistors have substantially identical characteristics.

Claim 44 (withdrawn)

In a combination as set forth in claim 43 wherein

the first and second low pass filters are connected in a differential relationship to provide across the second capacitor a signal which is free of noise and wherein

the first and second electrodes have substantially identical characteristics and the amplifiers have substantially identical characteristics and the first and third capacitors have substantially identical characteristics.

Claim 45 (withdrawn)

In combination as set forth in claim 41 wherein

fourth, fifth and sixth capacitors are connected in a series relationship and wherein each of the fourth, fifth and sixth capacitors has first and second terminals and wherein

the first terminals of the fourth and sixth capacitors are at a reference potential and wherein the second terminals of the fourth and sixth capacitors are respectively connected to the first and second terminals of the fifth capacitor.

Claim 46 (withdrawn)

In a combination as set forth in claim 41 wherein

each of the amplifiers has first and second input terminals and an output terminal and wherein

the first input terminal of each amplifier is connected to one of the electrodes and wherein the second input terminal of each amplifier is connected to the output terminal.

Claim 47 (withdrawn)

In a combination as set forth in claim 46 wherein

the impedance between the input terminals of each amplifier approaches infinity and wherein the output impedance on each of the amplifiers is low in comparison to the impedance between the input terminals of the amplifier.

Claim 48 (withdrawn)

In a combination as set forth in claim 42 wherein

each of the amplifiers has an input impedance approaching infinity and has a low output impedance and the amplifiers have substantially identical characteristics and wherein

a first resistor is connected between the first electrode and the second terminal of the first capacitor to define a first low pass filter with the first capacitor and is connected to an input terminal of the first amplifier and wherein

a second resistor is connected between the second electrode and the second

terminal of the third capacitor to define a second low pass filter and is connected to an input terminal of the second amplifier and wherein

the first and second resistors have substantially identical characteristics.

Claim 49 (withdrawn)

In a combination as set forth in claim 43 wherein

the first and second low pass filters are connected in a differential relationship to provide across the second capacitor a signal which is free of noise and wherein

the first and second electrodes have substantially identical characteristics and the amplifiers have substantially identical characteristics and the first and third capacitors have substantially identical characteristics.

Claim 50 (withdrawn)

In a combination as set forth in claim 48 wherein

each of the amplifiers has first and second input terminals and an output terminal and wherein

the first input terminal of each amplifier is connected to one of the electrodes and wherein the second input terminal of each amplifier is connected to the output terminal of the amplifier.

Claim 51 (withdrawn)

In a combination as set forth in claim 46 wherein

the impedance between the input terminals of each amplifier approaches infinity and wherein the output impedance of each of the amplifiers is low in comparison to the impedance between the input terminals of the amplifier.



Claim 52 (withdrawn)

In a combination as set forth in claim 41 wherein

a first resistor is connected between the first electrode and the first terminal of the second capacitor to define a first low pass filter with the first capacitor and wherein,

a second resistor is connected between the second electrode and the second terminal of the second capacitor to define a second low pass filter with the third capacitor and to define a differential relationship with the first low pass filter.

Claim 53 (withdrawn)

In a combination as set forth in claim 50 wherein

a first resistor is connected between the first electrode and the first terminal of the second capacitor to define a first low pass filter with the first capacitor and wherein,

a second resistor is connected between the second electrode and the second terminal of the second capacitor to define a second low pass filter with the third capacitor and to define a differential relationship between the first low pass filter and the second low pass filter.

Claim 54 (withdrawn)

In a combination as set forth in claim 47 wherein

a first resistor is connected between the first electrode and the first terminal of the second capacitor to define a first low pass filter with the first capacitor and wherein,

a second resistor is connected between the second electrode and the second terminal of the second capacitor to define a second low pass filter with the third capacitor and to define a differential relationship between the first low pass filter and the second low pass filter.

Claim 55 (withdrawn)

In a combination for providing at selective positions on a patient's skin signals representing the patient's parameters at these positions,

first and second electrodes connected to first and second positions on the patient's skin to provide signals representing the patient's parameters at these positions,

first and second amplifiers respectively connected to the first and second electrodes to provide signals corresponding to the signals produced at the electrodes, each of the amplifiers having a high input impedance and a low output impedance,

first and second low pass filters respectively connected to the outputs of the first and second amplifiers, the low pass filters being connected in a differential relationship to provide an output signal representing the difference between the outputs of the first and second amplifiers, the first and second low pass filters respectively including first and second capacitors providing the outputs from the filters, and

a third capacitor connected in series with the first and second capacitors to provide an output representing the difference between the signals on the first and second capacitors.

Claim 56 (withdrawn)

In a combination as set forth in claim 55 wherein

the electrodes have substantially identical characteristics and the low pass filters have substantially identical characteristics and the first and second amplifiers have substantially identical characteristics.

Claim 57 (withdrawn)

In a combination as set forth in claim 56 wherein

each of the first and second amplifiers constitutes an operational amplifier having

an input impedance approaching infinity and having a low output impedance in comparison to the input impedance of the amplifier.

Claim 58 (withdrawn)

In a combination as set forth in claim 57 wherein

each of the first and second amplifiers has first and second input terminals and an output terminal, the first input terminal of each of the amplifiers being connected to one of the electrodes and the second input terminal of each of the amplifiers being connected to the output terminal of the amplifier.

Claim 59 (withdrawn)

In a combination as set forth in claim 55

each of the amplifiers constituting an operational amplifier having an input impedance approaching infinity and having an output impedance which is low in comparison to the value of the input impedance.

60. (New) Apparatus as set forth in claim 36 wherein

the circuit includes a resistance and a capacitance connected in a circuit between the output of the amplifier and ground and wherein the output of the circuit is provided across the capacitance.

61. (New) Apparatus as set forth in claim 36 wherein

the low pass filter includes a resistor and a capacitor connected in series between the amplifier and ground and the output of the low pass filter is obtained across the capacitor.

62 (New) Apparatus as set forth in claim 33 wherein

the first low pass filter includes a first resistor and a first capacitor

connected in series between the first amplifier and ground and the output of the first low pass filter is provided across the first capacitor and the second low pass filter includes a second resistor and a second capacitor connected in series between the second amplifier and ground and the output of the second low pass filter is provided across the second capacitor.

63. (New) Apparatus as set forth in claim 62 wherein

the output from the first and second amplifiers constitutes the difference in the signals between the first and second electrodes.

64 (New) Apparatus as set forth in claim 35, including a circuit having a resistor and a capacitor in series between the amplifier and ground, the signals indicating the patient's parameter being provided across the capacitor.

65. (New) Apparatus as set forth in claim 38 including

first and second filters, the first filter being connected to the first amplifier and including a first resistor and a first capacitor connected in series between the first amplifier and ground, the second filter being connected to the second amplifier and including a second capacitor and a second resistor connected in series between the second amplifier and ground.

66. (New) Apparatus as set forth in claim 65 including

a third capacitor connected to the non-grounded terminals in the first and second capacitors to indicate the parameters at the pair of selective positions on the patient's body in accordance with the voltage across the third capacitor.

67 (New) Apparatus for providing at selective positions on the patient's skin signals representing the patient's parameters at these positions, including:

first and second electrodes adapted to be attached to the patient's body at

spaced positions on the patient's body,

first and second operational amplifiers respectively adapted to be connected to the first and second electrodes to provide output signals respectively corresponding to the signals on the first and second electrodes,

the amplifiers being connected to each other in a differential relationship,  
and

first and second circuits differentially connected to the amplifiers and to each other to produce signals corresponding to the difference between the signals on the electrodes.

68. (New) Apparatus as set forth in claim 67, including

each of the circuits including a reactance across which the signal difference from the electrodes is produced.

69 (New) Apparatus as set forth in claim 68, including

each of the circuits including a resistance and a reactance connected between an individual one of the amplifiers and ground and in which the output of the circuit is provided across the reactance at a terminal common to the resistance and the reactance in the circuit.

70. (New) Apparatus as set forth in claim 1 wherein

the apparatus has a single ground

71. (New) Apparatus as set forth in claim 2 wherein

the single ground is a true ground

72. (New) Apparatus as set forth in claim 7 wherein

the apparatus has a single ground

73. (New) Apparatus as set forth in claim 15 wherein

the apparatus has a single ground and the single ground is a true ground.

74. (New) Apparatus as set forth in claim 25 wherein

the apparatus has a single ground

75. (New) Apparatus as set forth in claim 35 wherein

the apparatus has a single ground

76. (New) Apparatus as set forth in claim 36 wherein

the single ground is a true ground

77. (New) Apparatus as set forth in claim 60 wherein

the apparatus has a single ground

78. (New) Apparatus as set forth in claim 69 wherein

the apparatus has a single ground and the single ground is a true ground.